

A compact high-resolution grating spectrograph for spaceborne infrared astronomy

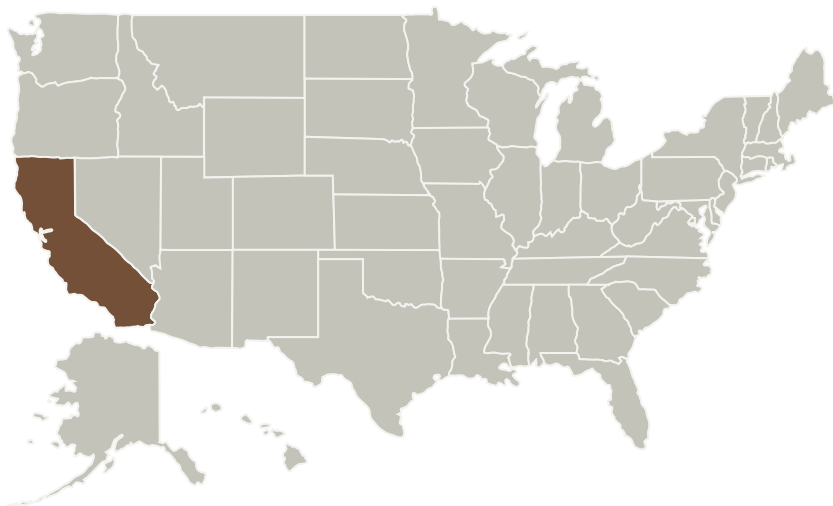
Completed Technology Project (2016 - 2018)



Project Introduction

The primary research area for this investigation is space-based astronomical observations of the infrared universe; specifically, in the areas of star and planet formation, astro-chemistry, evolved stars, solar system atmospheres, and probing the atmospheres of extra-solar planets. This proposed work's primary objective is to increase the technology readiness level of a high-resolution infrared spectrograph that employs a Germanium immersion grating as the primary diffractive optical element. This spectrograph's optical pathway would be designed to fit within a compact volume consistent with a low overall instrument mass, potentially enabling novel high-resolution spectroscopy on a small-format spacecraft. Additionally, maturing this capability now makes possible a high-spectral resolution mid-IR spectroscopy mode for 2020 Decadal Candidate missions such as the Far Infrared Surveyor or the Large Ultraviolet, Optical, and Infrared Surveyor. The investigation would deliver performance data from an optical-bench test version of a Germanium-immersion-grating-equipped instrument. This preliminary design and performance data will next be used to support a proposal for further technical readiness level advancement such as building a spectrograph for a ground-based, balloon-based, or sounding rocket telescope observations.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Responsible Program:

Astrophysics Research and Analysis

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Organizations Performing Work	Role	Type	Location
University of California-Davis(UC Davis)	Supporting Organization	Academia Asian American Native American Pacific Islander (AANAPISI)	Davis, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Michael A Garcia

Program Manager:

Dominic J Benford

Principal Investigator:

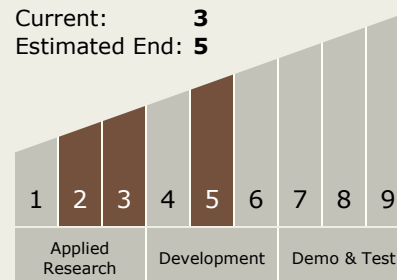
Matthew J Richter

Co-Investigators:

Scott A Sandford
 Abraham C Boogert
 Thomas Greene
 Victoria Whistler
 Kimberly E Smith
 Curtis Dewitt
 Peter T Zell

Technology Maturity (TRL)

Start: 2
 Current: 3
 Estimated End: 5



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - TX11.6 Ground Computing

Continued on following page.

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Technology Areas (cont.)

└ TX11.6.5 Public Cloud
Supercomputer

Target Destination Outside the Solar System